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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/753,722	01/04/2001	Shingo Iwasaki	041514-5103	2640

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EXAMINER

BAUMEISTER, BRADLEY W

ART UNIT	PAPER NUMBER
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2815

DATE MAILED: 06/13/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.  
09/753,722

Applicant(s)  
Iwasaki et al.

Examiner  
B. William Baumeister

Art Unit  
2815



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on Apr 22, 2002
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-46 is/are pending in the application.
- 4a) Of the above, claim(s) 6, 8, 15-29, 35, 37, and 44-46 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7, 9-14, 30-34, 36, and 38-43 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claims \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some\* c) ☐ None of:
- ☒ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \*See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s). 6 6) ☐ Other:

Art Unit: 2815

## **DETAILED ACTION**

### ***Priority***

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Election/Restriction***

2. Applicant's election without traverse of Invention/species ID in Paper No. 10 is acknowledged.

### ***Specification***

3. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

### ***Claim Objections***

4. Claims 1-5, 7 are 9-14 objected to because of the following informalities: claim 1, line 9 possesses a clerical error, in which the antecedent "a" is omitted: "...a carbon compound provided on at least one of [sic: a] top, bottom and inside..." Compare claim 30, last line, wherein the word "a" is included. Appropriate correction is required.

Art Unit: 2815

***Claim Rejections - 35 U.S.C. § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-5, 7, 9-14, 30-34, 36, and 38-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kaneko et al. '605 in view of EP '533.

a. Kaneko teaches MIM electron emitting devices having an electron source 1; an insulating layer 2 having a recess or island; and a metal thin film such as Au 3 formed thereover. Note particularly, (1) PRIOR ART FIG 2 wherein the SiO<sub>2</sub> insulating layer 54 is recessed inward and Au layer 55 is reduced on the sidewall (claim 9); (2) FIGs 4A/B wherein insulating layer 2 has a thickness of 50-200 angstroms in the recessed region and a thickness of 2000-5000 angstroms in the other regions (claim 11); FIG 5B wherein the metal 3 is terminated on the insulating layer 2 (claim 12); and (4) FIG 8 wherein the SiO<sub>2</sub> insulating layer 11 terminates on the underlying Si electron supply layer 10 (claim 13). Kaneko does not disclose the additional feature of a carbon region on at least one of a top, bottom and inside of the island region, as recited in claims 1 and 30.

b. EP '533 teaches a display apparatus including a pair of spaced substrates with a vacuum therebetween, a plurality of electron-emitting devices provided on the first substrate; a

Art Unit: 2815

collector electrode provided on an interior surface of the second substrate with a phosphor layer and wherein the electron emission devices have an electron supply (source) layer 12; an insulating layer 13; and a thin film metal electrode 15 which may be composed of Au. In the embodiment of FIG 26, an intermediate layer 14 having a work function which is lower than that of said thin-film metal electrode 15 is interposed between the insulating layer 13 and the metal thin film 15. See page 16, lines 20-25 wherein the reference teaches that this layer may be composed of C or ZrC. The Embodiment of FIG 34 also teaches that the low-work function material may be formed dispersed within the metal electrode 15.

c. It would have been obvious to one of ordinary skill in the art at the time of the invention to have employed the C-compound low work function material in the electron-emitter device of Kaneko--either as an interposed layer or alternatively by being dispersed within the metal thin film--for the purpose of facilitating the transfer of electrons from the insulator to the thin-film metal layer and thereby improving the device's stability and performance as taught by EP '533 (page 17, lines 26 and 58).

d. For clarification, the examiner notes that claim 10 reads at least on FIG 2 of Kaneko when modified so as to include interspersed low work function material as taught by EP 533.

e. Regarding claim 30 and its dependent claims, regardless of whether Kaneko expressly recites or implies the rest of the conventional features (e.g., vacuum, collector, phosphor), these elements are all taught by EP '533 and it would have been obvious to one of

Art Unit: 2815

ordinary skill in the art at the time of the invention to have employed them in conjunction with the Kaneko electron emitter for the purpose of providing a three-color display as taught by EP '533.

### *Double Patenting*

7. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b). **Please note that terminal disclaimers will be required for both of the following references in order to overcome the double-patenting rejection.**

Art Unit: 2815

8. Claims 1-5, 7, 9-14, 30-34, 36 and 38-43 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-9 and 19-27 of U.S.

**Patent No. 6,285,123** in view of Claims 1-14 of **U.S. Patent No. 6,166,487**.

a. Yamada et al. '123 claims a display apparatus including an electron emission device having an electron supply (source) layer 12; an insulating layer 13 having an island recess; and a metal thin film formed thereover. Yamada defines that the metal thin film or the insulating layer may be composed of a C compound, but does not claim a C region in addition to these layers.

b. Negishi et al. '487 claims a display apparatus including an electron emission device having an electron supply (source) layer 12; an insulating layer 13; a thin film metal electrode 15; and an intermediate layer 14 having a work function which is lower than that of said thin-film metal electrode. Negishi defines the meaning of layer 14 to include reading on C compounds such as C and ZrC (col. 21, lines 33 and 37). Negishi does not claim recesses in the insulating layer.

c. It would have been obvious to one of ordinary skill in the art at the time of the invention to have employed a C compound in the island-insulating-layer device as claimed by Yamada for the purpose of providing a low work function material as claimed by Negishi. Alternatively, it would have been obvious to one of ordinary skill in the art at the time of the invention to have formed island recesses as claimed by Yamada in the low-work function-layer device as claimed by Negishi for the purpose of increasing the tunneling probability as taught by Yamada.

Art Unit: 2815

*Conclusion*

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a. While Negishi et al. '487 does not, itself, constitute potential prior art for 102-103 purposes, the Japanese foreign priority documents listed therein do have sufficiently early publication dates to constitute potential prior art. An enclosed sampling includes:

i. JP 10-312738

ii. JP 10-312741

iii. JP 11-67065

b. Morikawa '974 teaches MIM electron emitters having a metal thin film 3 which terminates on insulating layer 2.

**INFORMATION ON HOW TO CONTACT THE USPTO**

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to the examiner, **B. William Baumeister**, at (703) 306-9165. The examiner can normally be reached Monday through Friday, 8:30 a.m. to 5:00 p.m. If the Examiner is not available, the Examiner's supervisor, Mr. Eddie Lee, can be reached at (703) 308-1690. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0956.



B. William Baumeister  
Patent Examiner, Art Unit 2815  
June 8, 2002